In the past several decades, trends in the manufacturing of medical supplies in the United States have swung precipitously toward disposable or Single-Use (SU) devices. While our European colleagues use a breathing circuit for an entire day of cases, linen for draping, and clean laryngoscopes for reuse, we routinely use SU versions and throw everything away after each case. Disposable laryngoscopes increase cost, require large amounts of raw materials and energy for manufacturing, and generate a massive amount of waste without a demonstrated reduction in infection transmission compared to reusable laryngoscopes. In addition to cost and safety considerations, the environmental impact of the supply chain must also be scrutinized when changing or purchasing new equipment.

Spaulding Device Cleaning Classification is the standard reference for determining the level of cleaning required for reusable medical devices.

<table>
<thead>
<tr>
<th>Level</th>
<th>Infection Risk</th>
<th>Description</th>
<th>Examples</th>
<th>Required Reprocessing Methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>Critical</td>
<td>High</td>
<td>Enter sterile areas, including the vascular system</td>
<td>Surgical instruments, implants</td>
<td>STERILIZATION</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>High-pressure steam</td>
</tr>
<tr>
<td>Semi-critical</td>
<td>Moderate</td>
<td>Contact mucous membranes or broken skin</td>
<td>Laryngoscope blades, rigid/flexible endoscopes, video laryngoscope blades</td>
<td>HIGH-LEVEL DISINFECTION (HLD)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Chemical reprocessing, vaporized hydrogen peroxide, glutaraldehyde, etc</td>
</tr>
<tr>
<td>Non-critical</td>
<td>Low</td>
<td>Contacts intact skin</td>
<td>Laryngoscope handles*, blood pressure cuffs, stethoscopes, video laryngoscope handles</td>
<td>LOW-LEVEL DISINFECTION (LLD)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Wipe disinfection, Sani-cloths, 70% isopropyl alcohol, quaternary ammonium</td>
</tr>
</tbody>
</table>

*Controversy over laryngoscope handle cleaning: AANA and AORN designate handles as non-critical devices. The ASA doesn’t delineate the laryngoscope blade and handle, and therefore, designates the entire device as a semi-critical device defaulting to HLD. The Society for Healthcare Epidemiology of America (SHEA) calls all parts semi-critical, needing HLD or sterilization or recommends SU devices over reusable. Some laryngoscope manufacturers have made handles compatible with HLD (not requiring disassembly, immersible) and list LLD options in the Instructions for Use. Studies have shown that following LLD, no pathogenic bacteria (VRE, MRSA, Gram-negative rods) or viral contamination was detected on the handles. Reusable handles treated with LLD or blades treated with HLD have not been shown to contribute to infection transmission.

**Life Cycle Assessment (LCA):**
Sometimes referred to as cradle-to-grave analysis, LCA is a methodology for assessing environmental impacts associated with all stages of a product’s life, from raw material extraction through manufacture, distribution, use (reuse and maintenance), disposal and recycling (when applicable). LCA is specific to geographic regions as energy sources vary (i.e., electricity generated from coal vs. wind). Sherman’s LCA comparing SU and reusable laryngoscopes found:

**Laryngoscope Environmental Impact** - measured in equivalent CO₂ emissions (CO₂e)
- SU steel handle = 20x higher CO₂e than low-level disinfection of reusable steel handles and 25x higher CO₂e than high level disinfection of reusable steel handles (based on 4000 uses for reusable handles).
- SU steel blades = 7x higher CO₂e than high-level disinfection of reusable steel blades and 2x higher CO₂e than sterilization of reusable steel blades.

**Laryngoscope Costs**
- Reusable handles are more economical than SU handles if used > 4-5 times (even considering losses).
- Reusable blades are more economical than SU blades if used > 5-7 times.
- Extrapolated over 1 year (60,000 intubations), cost savings of using reusable laryngoscopes was $675,000- $869,000 at Yale Hospital.

References:
1. Sherman J. Reusable vs. disposable laryngoscopes. APSF Newsletter, Feb 2019;91.